# Intelliviz - An Intelligent Telemetry Data Visualization Assistant, Phase I

Completed Technology Project (2008 - 2008)

## Project Introduction

Future space programs will require extensive monitoring of complex, highly instrumented systems such as the Orion spacecraft and lunar/Martian habitats. However, future missions will carry crews far from Earth, so they will need to operate with much greater independence and assume many system management functions currently carried out by flight controllers. Intelligent automation of telemetry data monitoring and system control can provide much of the autonomy needed. However, automation alone will not be enough. To handle tasks and situations that cannot be fully delegated to automation software, future flight controllers and crew must be able to monitor, review and interpret voluminous and complex telemetry data quickly to maintain necessary levels of situations awareness and make critical decisions rapidly and accurately. We propose to develop Intelliviz, an intelligent telemetry data visualization assistant that will create data visualizations automatically to reduce the effort and difficulty of specifying and constructing effective telemetry data visualizations. To infer the user's analysis goals from user actions, events, and state conditions, Intelliviz will encode and apply systems management expertise comprised of model-based knowledge of the spacecraft in combination with heuristic knowledge that relates symptoms to possible causes and diagnostic strategies. To select display methods and configure effective displays, Intelliviz will use case-based reasoning to encode and apply data visualization design expertise. Each case will encode a solution to a prototypical data visualization design problem described by data characteristics, user analysis goals, and user preferences. During this Phase I project, we will specify user interface and functional requirements, create representative use cases, design the Phase II system, and develop and evaluate a proof-of-concept prototype to illustrate our approach and demonstrate its utility and feasibility.


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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Ames Research Center (ARC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

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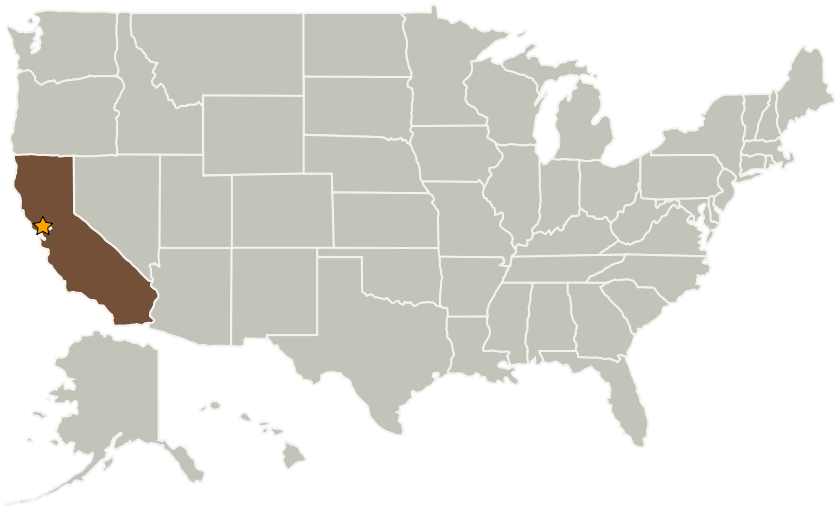
## Primary U.S. Work Locations and Key Partners



| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| ★Ames Research Center(ARC) | Lead Organization | NASA Center | Moffett Field, California |
| Stottler Henke Associates, Inc. | Supporting Organization | Industry | San Mateo, California |

| Primary U.S. Work Locations |
|---|
| California |

## Project Management

**Program Director:**
Jason L Kessler

**Program Manager:**
Carlos Torrez

**Principal Investigator:**
James J Ong

## Technology Areas

**Primary:**

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.5 Mission Architecture, Systems Analysis and Concept Development
    - TX11.5.2 Tools and Methodologies for Performing Systems Analysis